



Bendix® Wingman® Advanced™ A Collision Mitigation Technology

Operator's Manual

WARNING



WARNING: Improper use of the Bendix® Wingman® Advanced™ system can result in a collision causing property damage, serious injuries, or death. Be sure to read, understand, and follow all these instructions carefully.



WARNING: The driver is always responsible for the control and safe operation of the vehicle at all times. The Bendix Wingman Advanced system does not replace the need for a skilled, alert professional driver, reacting appropriately applying the brakes, steering or throttle as needed in a timely manner, and using safe driving practices.

**DO NOT
REMOVE FROM
VEHICLE**

This booklet contains important operational and safety information that benefits you and subsequent drivers.

Sources Of Additional Information About Bendix® Systems On Your Vehicle

Consult the vehicle manufacturer's documentation.

Visit www.bendix.com for free downloads of the Service Data sheets listed below, or order paper copies of these publications from the Literature Center at www.bendix.com.


- Bendix® Wingman® Advanced™ Service Data Sheets
SD-61-4962 for FLR-10 sensor version
SD-61-4960 for FLR-20 sensor version
- SD-13-4869 Bendix® EC-60™ ABS/ATC/ESP
Controllers (Advanced) Service Data Sheet


or contact the Bendix Tech Team via email at
techteam@bendix.com or call
1-800-AIR-BRAKE (1-800-247-2725) option 2.
Representatives are available
Mon.-Fri. 8:00 a.m. to 6:00 p.m. ET.

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Important Safety Information About Bendix® Wingman® Advanced™

SECTION 1: GENERAL

 **The driver is always responsible for the control and safe operation of the vehicle at all times. The Bendix® Wingman® Advanced™ system does not replace the need for a skilled, alert professional driver, reacting appropriately and in a timely manner, and using safe driving practices.**

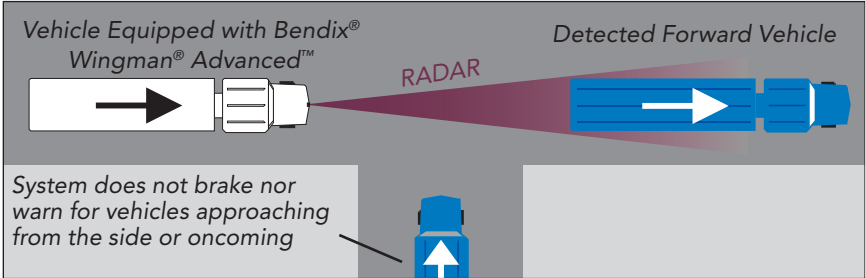
 **Use cruise control only in the conditions that are normally recommended for its use.** Setting the cruise control will also set the adaptive cruise control with braking feature of the Bendix Wingman Advanced system. It must never be used on roads where you can not drive safely at a steady speed, including city streets, winding roads and sharp curves, downhill grades, poor road conditions (such as gravel or dirt), ice or wet surfaces (wet surfaces may increase the risk of hydroplaning), or in fog, heavy rain or snowy conditions. **Also, the cruise control should not be used in inclement weather, in dense traffic, or where smaller vehicles—such as motorcycles—are ahead in the same lane.**

Always switch off the cruise control (by stepping on the brakes or turning off the cruise control switch) when entering turning lanes, entering or exiting highways, driving through construction zones, or similar situations. See page 22 for more details.

 **Variations from this Manual** – Vehicle manufacturers, and some previous models of the Bendix Wingman Advanced system, may use alerts, messages, and dash arrangements that vary from the examples shown here. Consult the vehicle operator's manual(s) for applicable details regarding use and operation.



The Bendix® Wingman® Advanced™ system reacts **ONLY** to vehicles moving in the same direction as your vehicle. The Wingman Advanced system **DOES NOT** respond to side-to-side moving traffic, or oncoming traffic. The system **WILL NOT** slow your vehicle or provide an alert as you approach vehicles in these circumstances.



When the Wingman Advanced system needs to intervene, it works in conjunction with the Bendix® ESP® electronic stability system to engage the brakes. **The system should never be relied upon to stop your vehicle or to avoid a collision.** The driver can, and should, still apply full braking force, if needed.

SECTION 2: DRIVER ALERTS & WARNINGS



Driver Alerts and Warnings – Before driving with Wingman Advanced, the driver should fully understand all the audible alerts and visual indicators that the system provides. This booklet will assist in explaining what each of them means. **Any audible and/or visual alert by the system means that your vehicle is too close to the vehicle ahead. The driver must immediately act to potentially avoid, or lessen the severity of, a collision.**



The Impact Alert (IA) is the most severe alert issued by the Wingman Advanced system. This alert indicates that a collision with the detected forward vehicle is likely. The driver must immediately act to potentially avoid, or lessen the severity of, a collision. The Impact Alert is ready to alert the driver whenever the vehicle is moving above 15 mph.

When activated, the IA will sound and a visual message/icon typically appears on the dash screen or Bendix® Driver Interface Unit (DIU) display. The actual sound/display method varies by vehicle manufacturer.



The Following Distance Alert (FDA) provides both audible and visual alerts whenever the time between your vehicle and the vehicle ahead is less than one and a half (1.5) seconds* and getting closer. Once the audible alert is given, the driver should increase the distance between his/her vehicle and the vehicle ahead until the audible alert stops. The FDA is ready to alert the driver whenever the vehicle is moving above five (5) mph. If the following distance continues to decrease, the driver will hear more rapid audible alerts. When the FDA reaches its highest level, typically a red LED also illuminates on the instrument cluster. The FDA may be accompanied by a visual alert.

** 1.5 seconds is the system default and may vary by fleet/OEM.*



Stationary Object Alert (SOA) – The Bendix® Wingman® Advanced™ system will give up to a three (3) second alert when approaching a detected, sizable, stationary object with metallic (radar-reflective) surfaces in your lane of travel. This alert indicates that a collision with a stationary object is likely. The driver must immediately act to potentially avoid, or lessen the severity of, a collision. The SOA is ready to alert the driver whenever the vehicle is moving above ten (10) mph.



Due to the inherent limitations of radar technology, the Stationary Object Alert System may alert in response to stationary objects not in the vehicle lane of travel. These objects may include bridges, signs, parked vehicles and traffic lights. Braking or throttle intervention will not occur in response to stationary objects. The driver remains responsible for safely controlling the vehicle at all times by appropriately applying the brakes, steering or throttle as needed.

The driver should be especially careful when approaching certain types of vehicles and objects. The Wingman Advanced radar may not be able to detect objects with limited metal surfaces (such as recreational vehicles, horse-drawn buggies, motorcycles, logging trailers, etc). *NOTE: Entering a curve may reduce the alert time to less than three (3) seconds.*



Pedestrians, Animals, Non-metallic or Limited-metallic Objects – The Wingman Advanced system will not warn or react to pedestrians, animals, and non-metallic objects. The system may not warn or react to limited-metallic objects (such as recreational vehicles, horse-drawn buggies, motorcycles, logging trailers, etc).



Metallic Objects May Impair the Radar – Objects that are radar-reflective—such as crash barriers, guard rails, construction zone barricades, and tunnel entrances—may impair the function of the radar.



Brake Overuse Alert - The Bendix® Wingman® Advanced™ system provides a warning when the system is intervening and using the foundation brakes excessively. Overuse of the foundation brakes can lead to the brakes overheating and a potential loss of braking performance caused by brake fade. Using cruise control on downhill runs will cause this alert to be activated.



Approach grades as you would normally, with the appropriate gear selected and at a safe speed.

Cruise control should NOT be used on downhill grades.

When the system detects brake overuse, depending on the vehicle manufacturer, a text message will be displayed on the dashboard and an audible alert will be activated. The driver should intervene immediately.

- Once the brake overuse alert is activated, certain driver interventions that cancel cruise control—such as stepping on the brake pedal or switching off cruise—will discontinue the alert. Following an overuse alert, the driver should not reset cruise control for at least 20 minutes. This gives the brakes time to cool down. If the driver chooses to reset cruise control during that 20 minute period, Wingman Advanced interventions will be limited to de-throttling and engine retarder only. The system will automatically disable all Wingman Advanced system foundation brake applications for at least 20 minutes.
- If the system does not detect a driver intervention within 15 seconds after the brake overuse alert sounds, it will shut itself off and set a Diagnostic Trouble Code (DTC). The driver will continue to receive alerts, but ALL Wingman Advanced interventions (de-throttling, engine retarder or brake applications) will be disabled until the next ignition cycle.

Note: In all cases, the driver still has the ability to apply the foundation brakes if necessary. The driver should take care since overheated brakes may reduce the vehicle's braking capability.

SECTION 3: EQUIPMENT MAINTENANCE



Importance of Antilock Braking System (ABS) Maintenance – Optimal Bendix® Wingman® Advanced™ system braking requires a properly maintained ABS system, without any active ABS Diagnostic Trouble Codes (DTCs). Have active DTCs repaired by a qualified technician. Any ABS DTCs will cause Wingman Advanced to deactivate.



Importance of Brake Maintenance – Optimal Wingman Advanced braking requires properly maintained truck foundation brakes (drum, wide-drum, or air disc) which meet appropriate safety standards and regulations. Brake performance also requires that the vehicle be equipped with properly sized and inflated tires, with a safe tread depth.



System Problems – If a problem with the Wingman Advanced system is detected, depending on the vehicle manufacturer, typically there will be a message on the dashboard display. Depending on the type of problem detected, the system will determine if the vehicle may continue normal cruise control functions (without the benefits of Wingman Advanced), or whether all cruise control functions should be disabled until service is performed. The system should be serviced as soon as possible to restore full Wingman Advanced functionality.



Radar Inspection – The driver should visually inspect the radar and mounting bracket regularly and remove any mud, snow, ice build-up, or other obstructions. The installation of aftermarket deer guards, bumper guards, snow plows or similar potential obstructions is not recommended, and could impair the operation of the radar. See *Bendix Technical Bulletin TCH-061-003*.



Radar Damage / Misalignment / Tampering – In cases where the bumper and/or radar have sustained any damage, are misaligned, or if you suspect that the radar has been tampered with, do not use the cruise control until the vehicle has been repaired and the radar realigned. In addition, an indicator on the dash typically will illuminate if the system detects any of these conditions. Consult your vehicle's operator's manual or contact Bendix for more information.

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Congratulations on Your Purchase.

You are now using one of the latest advances in commercial vehicle technology, the Bendix® Wingman® Advanced™ system. This Operator's Manual will explain the features and functions of this innovative system, enabling you to gain the maximum performance from the system.

Please read this manual thoroughly before operating the system. Familiarize yourself with the controls, the various system alerts, and what to expect when the system operates. Always keep this manual in the vehicle and use it as a reference for any questions you may have about the system, its operation and performance characteristics.

Thank you for your purchase of the Bendix Wingman Advanced system.



The Bendix® ESP® Stability System

All vehicles equipped with the Bendix® Wingman® Advanced™ system are also equipped with the Bendix® ESP® stability system. The Bendix ESP stability system is an always ready, full-stability system which monitors vehicle performance and, when necessary, automatically intervenes to reduce the throttle and/or apply the foundation brakes to help you maintain stability during potential loss-of-control or rollover events.

The Wingman Advanced system uses the ESP system to help maintain vehicle stability during automatic brake applications on slick surfaces.

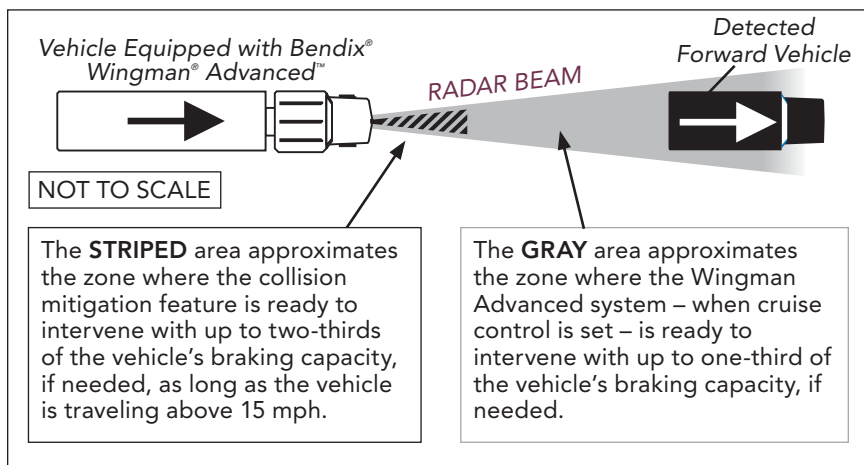
The Bendix ESP stability system and the Wingman Advanced system do not replace the need for the driver to remain alert, react appropriately and in a timely manner, and use safe driving practices.

The Bendix® Wingman® Advanced™ System Overview

The Wingman Advanced system is an integrated combination of three features:

- Adaptive cruise control with braking;
- Alerts (three types of alerts); and
- Collision mitigation technology.

See the diagram below.



What Features are Included in the Bendix Wingman Advanced system?

Part One: Adaptive Cruise Control with Braking

Think of the adaptive cruise control with braking feature as an additional upgrade to ordinary cruise control. When using cruise control, your vehicle not only will maintain the set speed, but the system also will intervene, as needed, to help maintain a set following distance behind the vehicle in front of you.

Using a radar (with a range of approximately 500 feet) mounted to the front of your vehicle, the Wingman Advanced system reacts **ONLY** to vehicles moving in the same direction as you. (The system **DOES NOT** respond to side-to-side moving traffic or oncoming traffic.)

See the **GRAY** area in the diagram above. The adaptive cruise control with braking feature is designed to help maintain a set following distance between your vehicle and the vehicle ahead when cruise control is set.

Once cruise control is set and the system is maintaining a set following distance between you and the vehicle in front:

- **If the vehicle in front of you slows down** below your cruise control's set speed, the system will intervene, as necessary, in this order:
 - (a) reduce the engine throttle, then
 - (b) apply the engine retarder, then
 - (c) apply the foundation brakes,
in an attempt to maintain the set following distance behind the vehicle ahead. *NOTE: If during the intervention, it is necessary to apply the foundation brakes, the vehicle will not automatically resume the cruise control set speed.*
- **If the vehicle ahead slows, below your cruise control's set speed, but then accelerates away** and the Bendix® Wingman® Advanced™ system did not need to use the foundation brakes, the system will automatically accelerate back to the original cruise control set speed, and again maintain a set following distance behind any vehicles ahead of you.

Because the Wingman Advanced system operates along with normal cruise control, all the typical features built into cruise control work as usual. For example, limits imposed by factory-set road speed governors, etc. are fully supported by the Wingman Advanced system.

Part Two: Alerts

Bendix Wingman Advanced also assists by giving audible and visual alerts, whether or not cruise control is on. See Pages 19-20 for more information on the three types of alerts you may hear and/or see displayed.

Part Three: Collision Mitigation Technology

See the *STRIPED* area in the diagram on page 10. Wingman Advanced's collision mitigation technology is designed to be ready to react to the presence of moving vehicles in front of your vehicle (whether or not cruise control is set). Collision mitigation interventions can be up to two-thirds of the vehicle's braking capacity. The system provides the driver with an alert before an intervention occurs. **You must immediately act to potentially avoid, or lessen the severity of, a collision.**

The Bendix® Wingman® Advanced™ System Components

The Wingman Advanced radar locates and tracks moving vehicles. The radar is located at the front of your vehicle – either on the bumper or just behind it on a cross-member. When located behind the bumper, in some cases the unit also may be behind a protective covering that allows the radar signal to pass through.

The Bendix® Wingman® Advanced™ radar is pre-aligned at the factory and no adjustment should be needed. If the radar becomes misaligned, (or any other system problem is detected) a message, or light on the dash lets the driver know that service is needed.

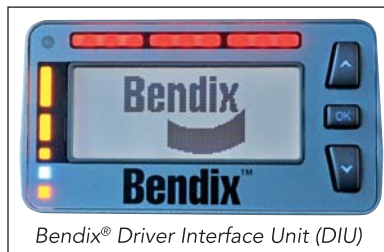


Above: Examples of radar sensors.

System Display

Driver information about the Wingman Advanced system is either fully integrated into the vehicle dashboard, or uses the Bendix® Driver Interface Unit (DIU). Although the system functions the same, how the alerts are displayed to the driver can be different. See the *Alerts and Warnings* section of this manual on pages 19-21 for more detailed information about the alerts.

NOTE: For some integrated systems, the volume level of the alerts is not adjustable, nor can they be switched off.



Bendix® Driver Interface Unit (DIU)

The Adaptive Cruise Control with Braking Feature

NOTE: Whenever the cruise control is set, the adaptive cruise control with braking feature is also set. You can not engage cruise control without also using all the features of the Bendix® Wingman® Advanced™ system.

Setting Cruise Control

Activating the adaptive cruise control with braking feature is as easy as using ordinary cruise control.



Examples of cruise control switches

First, switch on the cruise control. Accelerate your vehicle to the cruise control speed you wish to maintain, then press the cruise control set switch. The adaptive cruise control with braking feature is now ready and will help you maintain a set following distance.

Once the cruise control speed is set, a green cruise-enabled icon (or similar) will illuminate on the instrument panel. If the cruise-enabled (or similar) icon does not illuminate, the cruise control is not functioning normally. Please refer to your vehicle operator's manual to double-check the location of the icon and for further troubleshooting information.

Some vehicle manufacturers use the instrument cluster to momentarily show the cruise control set speed to the driver.

Where the Driver Interface Unit (DIU) display is used, a text message will provide the set speed information.

The driver can switch the adaptive cruise control with braking feature off manually by either stepping on the brake, or switching OFF the cruise control.



Example of Driver Interface Unit (DIU) detected forward Vehicle display

NOTE: *Cruise control will automatically cancel whenever the Bendix® Wingman® Advanced™ system applies the foundation brakes. You can verify the system is disengaged by observing that the cruise-enabled icon is no longer illuminated. You must resume or set cruise control in order to regain normal cruise control functionality and to reengage the adaptive cruise control with braking feature of the Wingman Advanced system.*

The Forward Detected Vehicle Icon

When cruise control is switched on and set, and a vehicle ahead of you is detected by the radar, the forward detected vehicle icon (or similar) on the vehicle dashboard will illuminate.

This is an indication to the driver that the Wingman Advanced system is actively managing the distance between your vehicle and the vehicle ahead, and that the system may automatically intervene.



Adjusting the Cruise Control Speed

Use the switch(es) provided by the vehicle manufacturer to set your cruise control speed. When adjusted, your set speed will typically be indicated on the vehicle dash, message center, or speedometer, etc.

What is Following Distance?

Following distance refers to the time gap – measured in seconds – between the vehicle with Wingman ACB and the vehicle ahead. The actual physical distance between the two will vary based on the speeds of both vehicles; however, the set gap will remain the same for all set cruise speeds.

Advanced Collision Mitigation Feature Operation

Whenever the vehicle is traveling above 15 mph, the Wingman Advanced collision mitigation feature is ready to intervene, if needed. It does not require cruise control to be set. The collision mitigation feature of Wingman Advanced will automatically alert you and apply up to two-thirds of the vehicle's braking capacity, if a collision with the detected forward vehicle is likely to occur. You, the driver, must immediately act to potentially avoid, or lessen the severity of, a collision.

Automatic Foundation Brake Applications

The vehicle automatically manages foundation braking priorities among the various vehicle systems that use the foundation brakes, such as Wingman Advanced, Bendix® ESP® (Electronic Stability Program), Bendix® ATC (Automatic Traction Control), and the Bendix® ABS (Antilock Braking System).

What to Expect When Using the Bendix® Wingman® Advanced™ System

The following charts illustrate what to expect from the Wingman Advanced system in various driving situations you may encounter. Both the system indication and action to expect from the system are illustrated on the following pages.

What to Expect		
Section One: All driving scenarios (Cruise is either "ON" or "OFF")		
Situation	Typical System Indication/Alerts	Typical System Actions
A broken-down vehicle is stationary in the lane in which your vehicle is traveling.	A Stationary Object Alert may be issued up to three (3) seconds prior to impact.	None.
A pedestrian, deer or dog runs in front of your vehicle.	None.	None.
Another vehicle crosses the road perpendicular to your path of travel – such as at an intersection.	None.	None.

What to Expect		
Section Two: Cruise control "ON" and speed "SET"		
Situation	Typical System Indication/Alerts	Typical System Actions
With no detected forward vehicle.	None.	Vehicle maintains set speed.
With a detected forward vehicle.	The cruise control ON indicator is illuminated and the detected forward vehicle icon is illuminated.	The adaptive cruise control with braking feature will maintain the set speed and following distance.
The detected forward vehicle slows <u>moderately</u>.	The Following Distance Alert (FDA) will sound and a visual message/icon typically appears on the dash screen or Bendix® Driver Interface Unit (DIU) display.	The vehicle will be slowed by (in order) (a) reducing throttle; (b) engaging the engine retarder; or (c) applying the foundation brakes. If the foundation brakes are applied, cruise control is cancelled.

What to Expect		
Section Two (continued): Cruise control "ON" and speed "SET"		
Situation	Typical System Indication/Alerts	Typical System Actions
The detected forward vehicle slows <u>rapidly</u>.	The Impact Alert (IA) warning (continuous tone), will sound and a visual message/icon typically appears on the dash screen or DIU display. The Following Distance Alert may also be heard.	The vehicle throttle will be reduced; the engine retarder engaged; and the foundation brakes applied. The cruise control feature cancels after the event.
A detected forward vehicle cuts in front of your vehicle and <u>speeds away</u>.	Following Distance Alerts may be given to the driver, depending on the exact system configuration that has been set for the vehicle, and how close the vehicle cuts in front.	Vehicle maintains set speed.
Going down a grade with a detected forward vehicle. Cruise control should <i>NOT</i> be used on downhill grades. See the CDL manual instructions on proper gear usage for down grades.	DO NOT USE cruise control on downhill grades.	DO NOT USE cruise control on downhill grades.

NOTE: The system indicators/alerts above are typical, but may vary from the descriptions shown here by vehicle manufacturer, or earlier versions of the Bendix® Wingman® Advanced™ system.

What to Expect (continued)		
Section Three: Cruise control speed NOT "SET", or "OFF"		
Situation	System Indication/Alerts	Typical System Actions
If your vehicle comes up fast behind a slower-moving detected forward vehicle.	The Following Distance Alert (FDA) will sound and a visual message/icon typically appears on the dash screen or DIU display. Depending on how close your vehicle approaches, the system may initiate an Impact Alert.	If a collision is likely to occur, the collision mitigation feature will apply up to two-thirds of the vehicle's braking capacity. The driver must immediately act to potentially avoid, or lessen the severity of, a collision.
The detected forward vehicle slows <u>rapidly</u>.	The Following Distance Alert (FDA), or Impact Alert (continuous tone) will sound and a visual message/icon typically appears on the dash screen or DIU display.	If a collision is likely to occur, the collision mitigation feature will apply up to two-thirds of the vehicle's braking capacity. The driver must immediately act to potentially avoid, or lessen the severity of, a collision.

NOTE: The system indicators/alerts above are typical, but may vary from the descriptions shown here by vehicle manufacturer, or earlier versions of the Bendix® Wingman® Advanced™ system.

NOTE: These are examples of situations and typical Wingman Advanced system responses. However, this chart does not attempt to cover all possible situations.



Due to the inherent limitations of radar technology, the Collision Mitigation Technology—on rare occasions—may not detect moving vehicles or stationary objects in your vehicle's lane of travel. Alerts, warnings or brake interventions may not occur.



Due to the inherent limitations of radar technology, the Collision Mitigation Technology—on rare occasions—may react to moving vehicles not in your vehicle's lane of travel. Alerts, warnings or brake interventions may occur.

How Your Actions Impact the Bendix® Wingman® Advanced™ System

The following chart illustrates how the Wingman Advanced system will react to various actions you may initiate.


Action:	Reaction of Wingman Advanced:
If the driver does this:	Expect the Wingman Advanced system to do this:
Steps on the brake. (During a collision mitigation event)	The driver is always in control and is able to apply full braking power.
Steps aggressively on the accelerator. (During a collision mitigation event.)	The driver is always in control. His/her actions override any Wingman Advanced system actions. Note: If cruise control is engaged, it will be overridden until the accelerator is released; then cruise control will resume the original set speed automatically.
Steps on the brake. (When in cruise.)	Cruise control will be cancelled.
Steps on the accelerator. (When in cruise.)	Cruise control will be overridden until the accelerator is released; then cruise control will resume the original set speed automatically.
Switches on the cruise control.	Nothing. The adaptive cruise control with braking feature will not engage until the driver sets the cruise control speed.
Switches off the cruise control.	The adaptive cruise control with braking feature will turn off; the collision mitigation feature remains active and ready to intervene. The driver will continue to hear all alerts as needed.
Sets the cruise control speed.	The adaptive cruise control with braking feature is automatically activated, and your vehicle maintains set speed and following distance behind the vehicle ahead.
Covers or blocks the radar.	The Wingman Advanced system performance will be diminished or even disabled and a Diagnostic Trouble Code (DTC) will be set. A blockage will also affect engine cruise control availability.
Use normal cruise control "+/-" switch.	Vehicle speed increased (+) or reduced (-) to achieve the new set speed while actively maintaining the following distance with the vehicle ahead, if one is present within 500 feet.

NOTE: The system responses above are typical, but may vary from the descriptions shown here by vehicle manufacturer, or earlier versions of the Wingman Advanced system. These represent examples of driver actions and typical Wingman Advanced system responses, however this chart does not attempt to cover all possible situations.

Alerts and Warnings

The Bendix® Wingman® Advanced™ system is a unique, patented system that functions differently than other cruise control/forward collision alert and mitigation systems. It is important for **YOU** to fully understand the system's features, especially the driver indications and alerts.

Three main alerts provided by the Wingman Advanced system are the **Impact Alert (IA)**, **Following Distance Alert (FDA)**, and **Stationary Object Alert (SOA)**. All of the alerts are always ready to alert the driver, whether or not you are using cruise control.

 **WARNING:** Any audible and/or visual alert by the system means that your vehicle is too close to the vehicle ahead and the driver must immediately act to potentially avoid, or lessen the severity of, a collision.

The Driver Alerts and Warnings

Impact Alert (IA)


- Always ready



Above: Bendix® Driver Interface Unit (DIU)
- Showing Impact Alert warning - a loud continuous tone will also sound.

Below: Examples of other vehicle manufacturer's displays.



 The Impact Alert is the most severe warning issued by the Wingman Advanced system. This alert indicates that a collision with the detected forward vehicle is likely. The driver must immediately act to potentially avoid, or lessen the severity of, a collision. The Impact Alert is ready to alert the driver whenever the vehicle is moving above 15 mph.

When activated, the IA will sound and a visual message/icon typically appears on the dash screen or Bendix® Driver Interface Unit (DIU) display. The actual sound/display method varies by vehicle manufacturer.

NOTE: The Impact Alert is typically accompanied by automatic brake interventions. The Wingman Advanced system will apply up to two-thirds of your vehicle's braking capacity. The driver must apply additional braking, when necessary, to maintain a safe distance from the vehicle ahead.

Following Distance Alert (FDA)

- Always ready



Above: Driver Interface Unit (DIU) - Showing Examples of Following Distance Alerts - with progressively faster audible alerts.



The Following Distance Alert (FDA) provides both audible and visual alerts whenever the distance between your vehicle and the detected forward vehicle ahead is less than the one and a half (1.5) seconds* and getting closer. Once the audible alert is given, the driver should increase the distance between his/her vehicle and the vehicle ahead until the audible alert stops.

The FDA is ready to alert the driver whenever the vehicle is moving above five (5) mph. If the following distance continues to decrease, the driver will hear more rapid audible alerts. When the FDA reaches its highest level, typically a red LED also illuminates on the instrument cluster. The FDA may be accompanied by a visual alert.



Above: Examples of other vehicle manufacturer's displays.

* 1.5 seconds is the system default and may vary by fleet/OEM.

Stationary Object Alert (SOA)

- Always ready



DIU: Showing Stationary Object Alert - a continuous tone will also sound.

NOTE: Entering a curve may reduce the alert time to less than three (3) seconds.



Stationary Object Alert (SOA) – The Bendix® Wingman® Advanced™ system will give up to three (3) seconds alert to the driver when approaching a detected, sizable, stationary object with metallic (radar-reflective) surfaces in your lane of travel. This alert indicates that a collision with a stationary object is likely and the driver must immediately act to potentially avoid, or lessen the severity of, a collision.

The SOA is ready to alert the driver whenever the vehicle is moving above ten (10) mph.

The driver should be especially careful when approaching certain types of vehicles and objects. The Wingman Advanced radar may not be able to detect objects with limited metal surfaces (such as recreational vehicles, horse-drawn buggies, motorcycles, logging trailers, etc).

Special Alerts



Brake Overuse Warning – The Bendix® Wingman® Advanced™ system provides a warning when the system uses the foundation brakes excessively. Overuse of the foundation brakes can lead to the brakes overheating and a potential loss of braking performance caused by brake fade.



Approach grades as you would normally, with the appropriate gear selected and at a safe speed. Cruise control should NOT be used on downhill grades.

The driver should use appropriate gearing and brake techniques on downhill grades.

When the system detects brake overuse, depending on the vehicle manufacturer, a text message will be displayed on the dashboard and an audible alert will be activated.

- Once the brake overuse alert is activated, certain driver interventions that cancel cruise control—such as stepping on the brake pedal or switching off cruise—will discontinue the alert. Following an overuse alert, the driver should not reset cruise control for at least 20 minutes. This gives the brakes time to cool down. If the driver chooses to reset cruise control during that 20 minute period, Wingman Advanced interventions will be limited to de-throttling and engine retarder only. The system will automatically disable all Wingman Advanced system foundation brake applications for at least 20 minutes.
- If the system does not detect a driver intervention within 15 seconds after the brake overuse alert sounds, it will shut itself off and set a Diagnostic Trouble Code (DTC). The driver will continue to receive alerts, but ALL Wingman Advanced interventions (de-throttling, engine retarder or brake applications) will be disabled until the next ignition cycle.

Wingman® Advanced™ Diagnostic Trouble Codes

The Bendix® Wingman® Advanced™ system is monitored and if any malfunction is detected, a Diagnostic Trouble Code (DTC) will be set and the driver will be alerted. The exact alert given depends on the vehicle manufacturer: refer to your vehicle operator's manual and the Bendix Service Data Sheet SD-61-4962 for more information.

Potential False Alerts

The Wingman Advanced system should have significantly fewer false alerts than earlier systems. Radar technology is not perfect, and false alerts sometimes occur. Radar misalignment will likely lead to increases in false alerts. Drivers should take into account the road conditions, and

any other factors they are encountering, as they choose how to react to any alerts they receive from the Bendix® Wingman® Advanced™ system.

When Not to Use Cruise Control

The adaptive cruise control and braking feature in Bendix® Wingman® Advanced™ is automatically ready when normal cruise control is set.



This vehicle's cruise control must only be used in the same conditions that are normally recommended for ordinary cruise control. There are certain situations when cruise control should not be used:

Inclement Weather/Low Visibility Situations – Do not use cruise control in inclement weather or low visibility conditions—such as rain, snow, smoke, fog, ice or other severe weather conditions—that may affect the performance of the Bendix® Wingman® Advanced™ system.



Dense Traffic – Do not use cruise control in heavy traffic.



Sharp Curves and Winding Roads – Do not use cruise control when traveling sharply curved or winding roadways. **CAUTION:** Road curvature may impact the radar's ability to track vehicles ahead in the same lane.



Entrance or Exit Ramps – Do not use cruise control when entering or exiting roadways.



Downhill Grades – Do not use cruise control on downhill grades.



Construction Zones – Do not use cruise control in construction zones.



Off-Road – Do not use cruise control in off-road conditions.



Smaller Forward Vehicles – Smaller forward vehicles, such as motorcycles, may be difficult for the radar to identify. It is the driver's responsibility to be aware of these types of vehicles and to slow down if necessary.



Visit www.bendix.com for more information and any updates to these limitations and restrictions.

Additional Operational Notes

Adjusting the Alert Volume

The Bendix® Wingman® Advanced™ system audible alerts are pre-set at the factory for fully integrated systems and can not be turned off by the driver, nor can the volume be adjusted, unless configured to do so. For systems using a Driver Interface Unit (DIU) display, see the Service Data Sheet (SD-61-4962) for information about volume adjustment.

Passing a Vehicle/Changing Lanes

With cruise control set, if the driver decides to change lanes or pass a vehicle by applying the throttle, the vehicle being passed will no longer be detected by the radar.

When No Other Vehicles are Present

When no forward vehicle is within range of the radar, your vehicle will maintain its set speed just like ordinary cruise control.

Radar-Reflective Stationary Vehicles & Objects

The driver should be attentive to stopped vehicles and objects on the roadway.



The Bendix® Wingman® Advanced™ system will give up to three (3) seconds alert to the driver when approaching a detected, sizable, stationary object with metallic (radar-reflective) surfaces in your lane of travel.



The SOA is ready to alert the driver whenever the vehicle is moving above ten (10) mph. The SOA is an alert only. No intervention actions (such as de-throttling, engaging the engine retarder or applying the brakes) will be taken. This alert indicates that a collision with a stationary object is likely. The driver must immediately act to potentially avoid, or lessen the severity of, a collision.



Metallic Objects May Impair the Radar – Objects that are radar-reflective—such as crash barriers, guard rails, construction zone barricades, and tunnel entrances—may impair the function of the radar.

Pedestrians, Animals, Non-Metallic and Limited-Metallic Objects



Pedestrians, Animals, Non-metallic or Limited-metallic Objects – The Bendix® Wingman® Advanced™ system will not warn or react to pedestrians, animals, and non-metallic objects. The Wingman Advanced system may not warn or react to limited-metallic objects (such as recreational vehicles, horse-drawn buggies, motorcycles, logging trailers, etc).

Tracking Vehicles in a Curve

With cruise control set, when following a detected forward vehicle around a curve, the forward vehicle may be lost by the radar. The adaptive cruise control with braking feature will delay acceleration back to the set speed until it regains contact with the vehicle ahead, or detects that there is no longer a vehicle ahead, or after a time gap (based on the last following distance recorded).

For example: Assume cruise control is set at 50 MPH and you are following 3 seconds behind a vehicle traveling at 45 MPH that just entered a sharp curve. If the vehicle ahead is no longer detected as you travel around the curve, the Wingman Advanced system will delay the vehicle acceleration back to 50 MPH for 3 seconds.

The operator should be especially attentive to the Wingman Advanced system behavior through curves. In some cases, when traveling around a curve, the radar may lose the vehicle ahead and attempt to accelerate when resuming the set speed.

It is also possible for the Wingman Advanced system to begin tracking vehicles in other lanes when traveling around curves. In cases where the Wingman Advanced system perceives that an adjacent-lane vehicle is in your lane, the system may intervene and begin making brake applications.

Applying the Brakes Before the System Does


If the driver determines that a hazard or unsafe condition exists, you should take all necessary actions immediately. **Never wait for the Wingman Advanced system to intervene.**

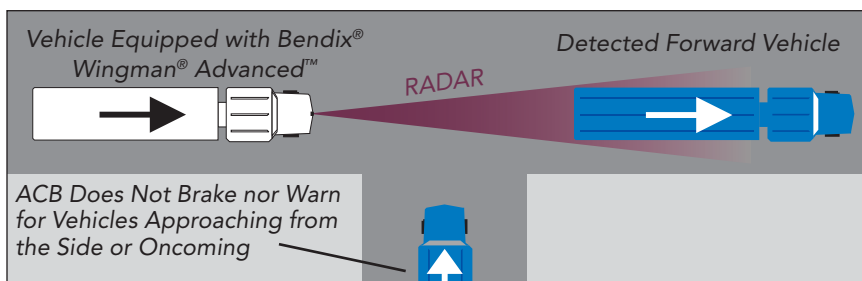
Safe operation and control of the vehicle is the responsibility of the driver at all times. If the driver applies the brakes, cruise control will disengage automatically, and no Wingman Advanced intervention will occur.

Approaching Slower Moving Vehicles

When approaching a slower-moving vehicle ahead, the driver should anticipate this and begin applying the vehicle's brakes early. **Do not wait for the Bendix® Wingman® Advanced™ system to intervene.**

Vehicles Crossing Your Path or Coming Towards You


 **The Bendix® Wingman® Advanced™ system reacts ONLY to vehicles moving in the same direction as your vehicle. The Wingman Advanced system DOES NOT respond to side-to-side moving traffic, or oncoming traffic. The system WILL NOT slow your vehicle or provide an alert as you approach vehicles in these circumstances.**




Stability System Performance

See the Bendix® ABS/ATC/ESP® Operator's Manual, included in this vehicle, for details about the stability system.

System Maintenance and Troubleshooting

 **Importance of Foundation Brake Maintenance** – Optimal Wingman Advanced system braking requires properly maintained truck foundation brakes (drum, wide-drum, or air disc) which meet appropriate safety standards and regulations. Brake performance also requires that the vehicle be equipped with properly sized and inflated tires, with a safe tread depth.


 **Importance of ABS Maintenance** – Optimal Wingman Advanced system braking requires a properly maintained ABS (Antilock Brake System) system. Have any ABS Diagnostic Trouble Codes (DTCs) corrected by a qualified technician at the earliest opportunity.

Preventive Maintenance:

The Bendix® Wingman® Advanced™ system is relatively maintenance free. The key items to keep the system functioning properly include:

1. Keep the radar lens clean and free of obstructions.
2. Visually inspect for any damage to the bumper or the Bendix® Wingman® Advanced™ cover, bracket or radar to ensure that the alignment has not been compromised. **Never use the radar unit as a step.**
3. Periodically check the radar alignment.
4. Perform appropriate inspections of the braking system as required by the manufacturer to ensure brakes are in proper working order.
5. Ensure that the tires are properly inflated and that adequate tread is present.

When the Bendix® Wingman® Advanced™ System Isn't Working:

 If the Bendix Wingman Advanced system has detected a problem, depending on the vehicle manufacturer, there will typically be a warning message on the dashboard display and a Diagnostic Trouble Code (DTC) will be set. The system will determine, depending on the type of problem detected, if the vehicle may continue to have normal cruise control functions (without the benefits of the Wingman Advanced system), or if all cruise control functions need to be disabled until servicing is carried out. The system should be serviced as soon as possible to restore full functionality.

Frequently Asked Questions

1. ***Are automatic foundation brake interventions always ready to intervene?***

Yes. The Wingman Advanced system will alert the driver and activate the foundation brakes when a collision with a detected forward vehicle is likely. The Bendix Wingman Advanced system does not replace the need for the driver to remain alert, react appropriately and in a timely manner, and use safe driving practices.

2. ***Are the three driver alerts always available?***

Yes. All three driver alerts (Impact Alert, Following Distance Alert and Stationary Object Alert) are always ready to alert the driver regardless of whether or not cruise control is operating, unless a DTC is set.



Example of Impact Alert Warning Display



Example of Following Distance Alert Display



Example of Stationary Object Alert Display

3. How can I tell the difference between the alerts?



Any audible and/or visual alert by the system means that your vehicle is too close to the vehicle ahead and the driver must immediately act to potentially avoid, or lessen the severity of, a collision.



A solid tone means you should actively apply the brakes because the Bendix® Wingman® Advanced™ braking capability is not enough to ensure a safe following distance. The alerts are audibly different, assisting the driver to pay full attention to the road, not the dash.

4. Does the Wingman Advanced system detect stationary objects?

Yes. The system will give up to three (3) seconds alert when approaching a detected, sizeable, stationary object with metallic (radar-reflective) surfaces in your lane of travel.

5. Can I use an aftermarket “deer guard” on my truck?

The installation of aftermarket deer guards is not recommended, and could impair operation of the radar. See *Bendix Technical Bulletin TCH-061-003*.

Other Information

FCC Part 15

This device complies with part 15 of the FCC Rules with the limits for a Class B digital device and with RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation.



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